



PATENT-& REGISTRERINGSVERKET
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International patent application No. PCT/SE03/00519
Applicant: Micronic Laser Systems AB et al
Reply due: April 6, 2004

Reply to first written opinion of February 6, 2004.

In WO 00/20928, hereinafter referred to as the 928 patent, a photomask for projection lithography at or below about 160 nm is disclosed. The object of the invention is to provide a mask with desirable optical properties, such as a phase shift mask with transmission targeted to wavelength at or below 160 nm.

We, on the other hand try to solve the problem of reflectance of the writing wavelength into the resist when making the mask/reticle. The solution to this problem according to claim 1 is to form a layer of material on the mask substrate such that a reflectivity of a writing wavelength back into a film sensitive to the writing wavelength (resist) is below 4%.

In the 928 patent there is no disclosure of reflectivity back into the resist. The reflectivity that is spoken about in the 928 patent is the reflectivity in the scanner when the mask is used and is between the masking layer and air. This has traditionally (since the 70ies) been 11% and is thought to affect the stray-light level in the scanner.

Figure 16, in the 928 patent, at first glance seems to be pertinent, but on closer analysis Fig. 16 says nothing about the reflectivity during mask writing since mask writing will most likely be done at 193 or 248 nm radiation for a mask that will be used with 157 nm radiation.



In the 928 patent there is no disclosure about the method of producing the mask or reticle, on the contrary there is only a disclosure about the use of the same. Most probably said photomask has been manufactured with an electron beam pattern generator, but one can only guess since the description is totally silent about the method of manufacturing said mask/reticle.

The 928 patent discloses a solution to the problem of using the mask/reticle in a stepper.

Since the 928 patent discloses the solution to the above-mentioned problem instead of, as in the present application, the solution to the problem of manufacturing the mask/reticle, the object of our invention and the 928 patent differ in character. Therefore a skilled person would not use said document as prior art.

If said skilled person anyway would look into said 928 patent, said skilled person would not arrive at our claimed invention. There is no disclosure in said 928 patent of any problem with reflected light into the resist when making the mask/reticle. Moreover, there is no disclosure of manufacturing said mask/reticle at other wavelengths than those at or below 160 nm, masks or reticles are most often manufactured at other wavelengths than the ones mentioned in the 928 patent, and the time for preparing a mask is extremely different to the time it takes to produce a wafer by using said mask.

In JP 61232457 there is no disclosure about reflectivity into the resist, therefore the same argument as presented above for the 928 patent is applicable for JP 61232457.

WO 02/23272 is also silent about reflective light into the resist layer. On page 11 line 16, there is an explanation of this anti-reflective layer, which is, as discussed above, to enhance the properties of the mask in a stepper.

It is believed that this explanation will make it possible to issue an overall positive preliminary report. If the examiner is of another opinion, we hereby respectfully request that contact is taken with the undersigned patent attorney in order to set a date for a personal interview (PCT Rule 66.6).



Täby, April 6, 2004
Micronic Laser Systems AB
IPR & Legal department

Johan Nordkvist